

REMARKS

Claims 11, 15, 16 and 19 have been rejected as allegedly being anticipated by U.S Reissue Patent No. RE. 32,476 to Kistner (hereinafter “Kistner”) and claims 12-14, 17, 18, and 20-27 have been rejected under as allegedly being obvious over Kistner. Applicant respectfully traverses these rejections.

Independent claim 11 of the claimed invention is directed to “a plant cultivating substrate produced by reacting: a water-retentive filling material, water, urethane prepolymer and a polyol under conditions which form a plant cultivating substrate,” and is different from Kistner not only as a process but also as a product.

Specifically, Kistner describes reacting polyol with isocyanate to prepare urethane prepolymer (*see, e.g.*, Kistner at col. 2, lines 37-42), and thus the substrate of Kistner is obtained by the water-retentive filling material reacting with water and urethane prepolymer.

On the other hand, in the plant cultivating substrate of the claimed invention, polyol is further added to react to the water-retentive filling material, water and urethane prepolymer. Thus, the resultant product of the claimed invention is naturally different from that of Kistner.

More particularly, in chemical reactions, if the order of reactions differs, the resultant product also differs even if the components used in the reactions are the same. This is common technical knowledge to a person of ordinary skill in the art. In the claimed invention, urethane prepolymer reacts to water and release carbon dioxide (CO₂) to form itself. Amine produced by this reaction further reacts to an isocyanate group to elongate the polymer chain, as a result of which the urethane sponge is obtained. On the other hand, Kistner reacts isocyanate to polyol first to obtain urethane prepolymer, and

then urethane prepolymer is allowed to react to the water-retentive filling material and water. Thus, polyol only plays a part in the reaction with isocyanate in Kistner and has nothing to do with the reaction of urethane prepolymer with the water-retentive material and water, as required in the claimed invention.

In other words, Kistner teaches away from the claimed invention since polyol is not present in the process of producing urethane sponge, urethane prepolymer only foamingly reacts to water in the similar manner to the conventional art. Whereas, claim 11 of the claimed invention requires reacting urethane prepolymer with the water-retentive filling material and water in the presence of polyol.

Urethane prepolymer has high reactivity with water, and amine produced by this reaction has also a higher reactivity with water than polyol. Thus, the elongation of the polymer chain caused by the foam-reaction of urethane prepolymer with water takes precedence to the reaction of urethane prepolymer with polyol. When polyol is present in the process of producing the urethane sponge as required in the claimed invention, at least part of polyol is incorporated into the polymer chain. However, since polyol has lower reactivity than amine produced by the reaction between urethane prepolymer and water, there exists difference in elongating velocity between the polymer chain having incorporated into polyol and the polymer chain produced by the reaction with amine. Due to the difference in elongating velocity, the cell membranes of the urethane sponge produced become uneven in the claimed invention, and the membrane is broken starting from the weakest point to communicate with the adjacent cell. As a result, the plant cultivating substrate of the claimed invention has a few independent pores hampering the cells from communicating with one another compared with Kistner's process where polyol is not present in the process of producing the urethane sponge, thereby the claimed cultivating substrate advantageously has numerous communicating pores allowing the cells to communicate with one another. These large number communicating pores are

capable of pumping water by capillarity, which tremendously improves the water-absorbing efficiency of the claimed plant cultivating substrate.

As noted herein, Kistner describes that polyol only gets involved in the reaction with isocyanate to produce urethane prepolymer while claim 11 of the claimed invention requires that polyol participates in the foam-reaction between urethane prepolymer and water to render the cell membranes of the resultant urethane sponge uneven. Thus, the roles of polyol are completely different between the claimed invention and Kistner, and naturally the products obtained by those processes are also totally different between the claimed invention and Kistner.

For the above-noted reasons, applicant respectfully submits that the plant cultivating substrate of claim 11 of the claimed invention is neither anticipated nor rendered obvious by Kistner, and thus believed fully patentable over the reference.

Independent claim 21 of the claimed invention is directed to “a method of manufacturing a plant cultivating substrate comprising reacting and curing (i) a water-retentive filling material, (ii) water, (iii) a urethane prepolymer and (iv) a polyol wherein said water-retentive filling material under dry conditions is from 15 to 60 wt.% of said plant cultivating substrate”.

Similar to independent plant cultivating substrate claim 11 of the claimed invention, independent method claim 21 requires that the reaction is performed in the presence of the water-retentive filling material, water, and urethane prepolymer, as well as polyol, and thus we believe independent claim 21 is also patentable for the same reasons set forth herein with respect to independent claim 11.

Remaining claims 12-20 and 22-27 depend from independent claims 11 and 21, respectively, and thus are also believed patentable over the prior art.

Please charge the 1-month extension fee and the Request for Continued Examination fee to the credit card. Attached is the PTO FORM PTO 2038. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to our Deposit Account No. 50-0624, under Order No. NY-KIT 404-US (10513311) from which the undersigned is authorized to draw.

Dated: April 14, 2010

Respectfully submitted,

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